

Design of Electron Cyclotron Heating and Current Drive System of ITER

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Since the end of EDA, the design of the Electron Cyclotron Heating and Current Drive (ECH&CD) System has been modified to respond to progress in physics understanding and change of interface conditions. Nominal RF power of 20 MW is shared by four upper launchers or one equatorial launcher. RF beams are steered by front steering mirrors providing wide sweeping angle for the RF beam. DC high voltage power supply will be composed of IGBT pulse step modulators because of high frequency modulation and design flexibility to three different types of 170GHz gyrotrons provided by three parties. The RF power from the 170GHz gyrotron is transmitted to the launcher by 63.5mm ϕ corrugated waveguide line and remotely switched by a waveguide switch between the upper launcher and the equatorial launcher. The ECH&CD system has also a start-up sub-system for assist of initial discharge composed of three 127.5GHz gyrotrons and a dedicated DC high voltage power supply. Three of transmission lines are shared between 170GHz gyrotron and 127.5GHz gyrotron so as to inject RF beam for the start-up through the equatorial launcher. R&Ds of components for high power long pulse have been on-going in the Parties to establish a reliable ITER ECH&CD system.